Amendments to the Claims:

Claims 1, 9, 10, 18, 19, and 21-41 have been amended. Claim 16 has been cancelled without prejudice. New claims 42-44 have been added. This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method for generating a computer model of one or more teeth, comprising:

receiving as input a digital data set of meshes representing the teeth;

selecting a curved coordinate system with mappings to and from a 3D space; ~~and~~

generating a function in the curved coordinate system to represent each tooth; and

rendering a graphical representation of the teeth using the computer model, wherein the rendering comprises rendering the teeth at a selected one of multiple orthodontic-specific viewing angles.

2. (Original) The method of claim 1, further comprising displaying the computer model of the teeth using the function and the coordinate system.

3. (Original) The method of claim 1, further comprising storing a compact coordinate system description and the function in a file representing a compressed version of the digital data set.

4. (Original) The method of claim 3, further comprising transmitting the file to a remote computer.

5. (Original) The method of claim 4, further comprising displaying the computer model of the teeth using the function at the remote computer.

6. (Original) The method of claim 4, wherein the file is transmitted over a network.

7. (Original) The method of claim 6, wherein the network is a wide area network.

8. (Original) The method of claim 6, wherein the network is the Internet.

9. (Currently Amended) The method of claim 1, wherein the coordinate system is based on ~~the following~~ equation:

$V = P(\phi, \theta) + R * \text{Direction}(\phi, \theta)$

where V is ~~the~~ a corresponding point in three-dimensional (3D) space to (ϕ, θ, r), P and Direction are ~~a~~ vector functions expressed in terms of ϕ and θ.

10. (Currently Amended) The method of claim 9, wherein the P and Direction functions are selected to minimize ~~the~~ a deviation between the tooth model and a parametric surface specified by the curved coordinate system and the function.

11. (Original) The method of claim 9, wherein P and Direction are different for incisors and molars.

12. (Original) The method of claim 1, further comprising determining a radius value.

13. (Original) The method of claim 1, further comprising receiving an instruction from a human user to modify the graphical representation of the teeth and modifying the graphical representation in response to the instruction.

14. (Original) The method of claim 13, further comprising modifying the selected data set in response to the instruction from the user.

15. (Original) The method of claim 13, further comprising allowing a human user to select a tooth in the graphical representation and, in response, displaying information about the tooth.

16. (Canceled)

17. (Original) The method of claim 13, further comprising providing a user interface through which a human user can provide text-based comments after viewing the graphical representation of the teeth.

18. (Currently Amended) The method of claim 13, wherein rendering the graphical representation comprises downloading data to a remote computer at which a human ~~view~~ viewer wishes to view the graphical representation.

19. (Currently Amended) The method of claim 1, further comprising delivering data representing ~~the~~ positions of the teeth at selected points along ~~the~~ treatment paths to an appliance fabrication system for use in fabricating at least one orthodontic appliance structured to move the teeth toward ~~the~~ final positions.

20. (Original) The method of claim 1, further comprising detecting teeth collision using the curved coordinate system.

21. (Currently Amended) A computer-implemented method for communicating information on one or more teeth, comprising:

providing, at a first system, a 3-dimensional digital ~~tooth~~ model for a set of one or more teeth;

compressing the 3-dimensional digital ~~tooth~~ model at the first system to generate a compressed digital representation; ~~and~~

communicating the compressed digital representation from the first system to a second system ~~digital tooth model~~ over a network; and

generating a 3-dimensional digital model based upon the compressed digital representation at the second system.

22. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model further comprises:

selecting a curved coordinate system with mappings to and from a 3D space; and

generating a function in the curved coordinate system to represent each tooth in the set of teeth.

23. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than five kilobytes in size.

24. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between five kilobytes and one hundred kilobytes in size.

25. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between one hundred and five hundred kilobytes in size.

26. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between five hundred kilobytes and one megabyte in size.

27. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between one and five megabytes in size.

28. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between five and ten megabytes in size.

29. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between ten and fifty megabytes in size.

30. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between five kilobytes and fifty megabytes in size.

31. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is between five kilobytes and one megabyte in size.

32. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than one megabyte in size.

33. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than two megabytes in size.

34. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than three megabytes in size.

35. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than four megabytes in size.

36. (Currently Amended) The method of claim 21, wherein ~~the~~ compressing the 3-dimensional digital model generates a file that is less than five megabytes in size.

37. (Currently Amended) The method of claim 21, wherein ~~the~~ communicating the 3-dimensional digital model further comprises generating an image of the 3-dimensional digital model.

38. (Currently Amended) The method of claim 21, wherein the 3-dimensional digital model comprises ~~at least~~ five teeth.

39. (Currently Amended) The method of claim 21, wherein the 3-dimensional digital model comprises ~~at least~~ ten teeth.

40. (Currently Amended) The method of claim 21, wherein the 3-dimensional digital model comprises a jaw.

41. (Currently Amended) The method of claim 21, wherein the 3-dimensional digital model comprises gingiva.

42. (New) The method of claim 21, wherein compressing the 3-dimensional digital model comprises:

removing one or more sections of the 3-dimentional digital model that are not needed for creation of a tooth repositioning appliance.

43. (New) The method of claim 21, wherein the compressed digital representation comprises a grid of points, wherein coordinates for each point in the grid of points are stored as integer values.

44. (New) The method of claim 21, wherein the first system is a system used by a teeth treatment plan designer and the second system is a system used by a treating clinician.